1. INTRODUCTION

Livestock and poultry have playing an important role in the national economy, contributing significantly to agriculture and the gross national product. About 44% of human daily intake of animal protein comes from livestock products. Furthermore it plays a pivotal role in the rural socio economic system as maximum households directly involved in livestock (*Hamid et,al. 2017*). The Bangladesh Rural Advancement Commission (BRAC) shows in its annual report that more than 70% of rural households are involved in broiler keeping (*Ali et.al, 2012*). The broiler industry has been successfully becoming a leading industry in Bangladesh. One third of the total agricultural contribution (18.60%) in GDP added from poultry industry (*Khaled, 2014*). The sector accounts for 14% of the total value of livestock output and is growing rapidly. It is find out that poultry meat alone contributes 37% of the total meat production in Bangladesh. Poultry contributes about 22-27% of the total animal protein supply in the country (*Hamid et,al. 2017*). The growth of meat production was attributed to poultry as the production of beef and mutton remained almost immobile. At present chickens contributed 51% of total meat production of the country although the share of broiler is not separated and Per capita, annual consumption of meat in the country is 5.9 kg which is only 7.38% of the universal standard (*MoFL, 2006*). Broiler farming has been playing an important role in providing meat and creating employment opportunities for the people through the establishment of poultry hatcheries, feed mills, equipment manufacturing factories, processing and marketing of broiler and broiler product (*Heft-Neal et,al.2008*). Pioneered by the Eggs and Hens Ltd. As early as 1954 and steered by the Biman Poultry Complex after the independence, commercial poultry industry took a smooth takeoff through heavy investment of private sectors during nineties, and it accounts for an estimated capital investment of about US$3.0 billion facilitating employment of about 6.0 million peoples (*The Daily Ittefaq, March 10, 2011*). The poultry industry has been engaging supply of quality protein to the Bangladesh population at the lowest price in the world (*Hamid et,al. 2017*). Even though the broiler industry is an emerging industry of Bangladesh, it has encountered some problems in the way to its development. Farmers of Bangladesh face a wide range of poultry diseases, which reduces the optimal

production of the flock. During last few years several emerging diseases like IBD (Infectious bursal disease), Ranikhet, Aflatoxicosis, Avian influenza, Chicks anemia virus, Salmonella and some unknown cause threat the poultry industry and causes huge economic losses to the poultry farmers in all over the world (*Alkie and Rautenschlein, 2006).*

Therefore, the present study was undertaken to identify the existing management system of broiler farm, to know about housing design, feeding, brooding, lighting and litter management as well as vaccination process and vaccination schedule for broiler farms in Anowara Upazilla and the problems related with broiler production and their potential solution.

2. Materials and Methods

2.1 Objectives:

The study was conducted to investigate the management skills, the overall husbandry practices of broiler farming practices and the problems related with broiler production.

2.2 Study area:

The study was conducted in Anowara upazila, under Chattogram district of Bangladesh.

2.3 Study period:

The necessary information of the study was carried out from 06 October 2019 to 05 December 2019 and from 07 June 2020 to 27 June 2020. During this period data was collected on management techniques and problems of Broiler farming of this area.

2.4 Study population:

The study data was carried out only on broiler farms of Anowara upazila although it is a livestock growing area in daily, beef fattening, layer, duck and turkey farming.

2.5 Data collection:

During the study period data were collected by visiting 20 broiler farms at different locations of Anowara upazila and taking interview of the farm owners, their family members and workers related to farms. The questionnaire was carefully designed keeping in mind the objectives of the study. The questionnaire contained both open and closed forms of questions. Most easy, simple and direct questions were asked to obtain information. Data collected from the farmers were compiled and tabulated according to the objectives as well as the parameters.

2.6 Parameters studied:

To pursue the study a pre prescribed questionnaire was used to record different farm management parameters like farm size, housing system, commercial hybrid broiler strains, litter materials, brooding system,, lighting management, feeding system, FCR were studied. Vaccination schedule, de-worming, day old chicks purchase, feed

purchase and mortality rate were also included in this study. FCR and mortality rate was calculated using the following formulas:

$$\text{FCR} = \frac{\text{Total amount of feed (kg) consumed till marketing}}{\text{Total live weight (kg) gain till marketing}}$$

$$\text{Mortality rate (\%)} = \frac{\text{Total death till marketing}}{\text{Total DOC introduced in farm}} \times 100$$

2.5 Data analytical techniques

The collected data were analyzed with simple statistical methods such as mean, percentage etc. MS Excel 13 programme was used to analyze the collected data to meet up the study goals and objectives.

Result

Part 1: Management Practices in Broiler Farms

3.1 **Husbandry practice:**

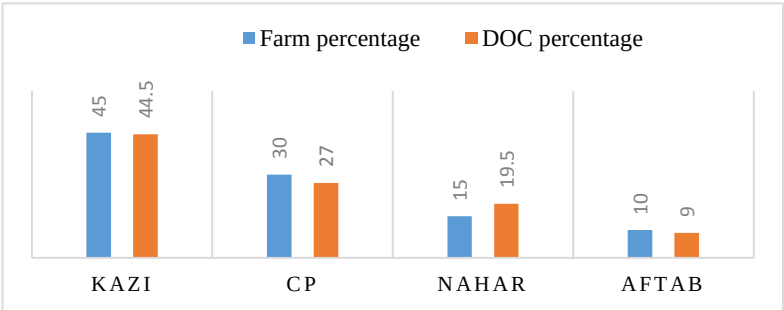
3.1.1 Collection of DOC and Flock size:

The farm owners collect the day old chicks from different hatcheries like Kazi Farms, CP, Aftab, Nahar broiler hatcheries., the CP, Kazi farms provide Cobb500 broiler strain and Aftab Co. provides Hubbard classic broiler strain. Mainly the local dealer of hatcheries take order from the farmer and supply chicks from respective hatcheries. The price of day old chick (DOC) was 45-50Tk. per chick.

Table 1: Flock Size and DOC supply of different hatchery companies in farms

Farm no.	**Flock size**	**DOC**	**Farm no.**	**Flock size**	**DOC**	**Farm no.**	**Flock size**	**DOC**
1	1200	Kazi	8	1200	Kazi	15	700	CP
2	800	Kazi	9	1000	CP	16	700	CP
3	1000	Kazi	10	700	Kazi	17	1200	Kazi
4	1200	CP	11	500	CP	18	1500	Nahar
5	1400	Nahar	12	1000	Aftab	19	1000	Nahar
6	600	Kazi	13	800	Aftab	20	1000	Kazi
7	1300	CP	14	1200	Kazi			

Here, five hundred to one thousand birds were found in 12 farms and 8 farms was found within fifteen hundred birds rearing.



Graph 1: Comparison of DOC supply between different broiler hatcheries (Here, farmers were found to collect DOC from Kazi farms more than other hatchery farms.)

3.1.3 Housing system:

Two types of house are observed during data collection - Brooder house and Grower cum finisher house**.** Separate sheds ware seen in multi-flock farms but in single flock small farms there was only one shed which provided both purpose. The housing system in the study area was open sided, tin shed roof mostly.

Table 2: Floor types of broiler farming in Anowara upazila

Floor type	**Farm no.**	**Percentage**
Kacha	14	70
Pakka	6	30
Total	20	100

3.1.4 Floor, feeder and drinker allowance followed by the farmers are given below:

A. Floor space: On average farmers gave 0.5 – 1 sq.ft. Per bird. Which is slightly below the standard level 1sq.ft per birds *(Samad MA. 2005, Expert system, 2020)*

B. Feeder and drinker equipment:

Table 3: Average feeder and drinker use in broiler farms

Period of flock	**Feeder supply**			**Drinker supply**		
	Type	**Unit /100birds**	**Standard**	**Type**	**Unit /100birds**	**Standard**
Brooding	Linear	1	1	Small	2	2
After brooding	Round	3-4	4-5	Round	3-4	4-5

Here, the waterer and feeder given by the farmers is slightly lower than the standard *(Samad MA. 2005).*

In all the farms, clean water were supplied form the deep tubewell that were used for the human consumption. Water were changed 1-2 time in a day.

3.2 Brooding management:

Farmers use spot or canopy brooding set up with round chick guard and hover for brooding of DOC. For 350 DOC, a 7-7.5ft radius chick guard was provided which gradually increased day by day for 3-4 days. Tungsten light is used to maintain the suitable temperature inside the ring. And then released to the shed on one side of the farm with small area. At this time farmers used tungsten light in the farm. As the chick grow the light are replaced by florescent lights. The brooding period maintain for almost 7-12 days.

3.3 Lighting management:

Lighting period was very much simple. Farmers try to provide 24 hours light to the birds. Mainly in brooding period the shed remain covered with dark polythene to prevent any extreme weather and provided 24 hours light. After that, farmers provide light only from dusk to dawn with few hours (1.5-2 hours in total) of load-shedding. On an average in this period, farmers provided 21-22 hours light to the birds with florescent light. There is no specific measurement of bulb number uses but on an average farmers provide one 12W florescent bulb for 40-50 sq ft. which hanged out from the ceiling at 2-3 ft. above from ground and gradually rise up to 6-7ft at the end.

3.4 Feeding system: Most of the farmers used the feed from companies named CP and Kazi farm. The feed from the other companies like Pro vita feed and Nourish were also used by some farmers.

Table 4: Feed used from different feed companies by farmers

Feed company	**Farm no**	**Percentage**
Kazi	8	40
CP	6	30
Provita	4	20
Nourish	2	10

Nutritional level of Quality feed is as follows

Table 5: Nutritive values of feeds of Broiler Farms

Nutrients	Quality feed		
	Broiler starter	**Broiler grower**	**Broiler finisher**
Moisture %	11	11	11
CP%	21	21	21
CF%	3.5	3.5	3.5
Fat%	5.6	5.5	5.5
P%	0.5	0.5	0.5
Ca%	1	1	1
ME kcal/ kg	3000	3100	3200

Most of the farmers use 2 types of feed like broiler starter for 12-16 days and then broiler finisher feed until birds selling. In some farms, there is uses three types of feed as given below (Table 6).

Table 6: Different feeds and feed types used in farms

Feed types	**Feed size**	**Time**
Broiler starter	Crumble	0-14 days
Broiler grower	Pellet	14-22 days
Broiler finisher	Pellet	22- tili marketing

3.5 Litter management: The study revealed that the highest number of farmers used saw dust and a few used rice husk as litter material. (Table 7).

Table 7: Litter materials used in the study area

Litter materials	**Farm no.**	**Percentage**
Saw dust	16	80%
Rice husk	4	20%

At the beginning, farmers provide a 1.5-2 inch layer of litter materials and add gradually upto 5 inches mixing with new littler at the end. Farmers shake up

the litter materials at least once a day. After flock marketing the some litter materials dry up in the sun some are used in field as fertilizer.

3.6 Biosecurity management: several basic safety measurements were observed during the farm visit. Farmers used separate sandal and dress to enter the farm. 2-3 family members could enter into the farm who works daily in the farm. There was no foot bath in any farm during the farm visit. Farmers were careful about farm ventilation. They use dark polythene paper and jute bag-sheet to cover the shed which remain up or open most of the time except few hours at night and extreme weather condition. The feeds were kept above the ground by tables to prevent rodent infestation. After the flock marketing, most of the empty shed (16 farms) cleans with lime water and other used lime water with lyzol solution for disinfecting the floor.

3.7 Common diseases and vaccines applied in the study area:

Diseases were frequently affecting in all poultry farms in the study area. Among them the prevalence of Ranikhet, Gumboro, Colibacilosis were the most common. Other than these, Mycoplasma infection and Coccidiosis, Infcetioius bronchitis were also found sometimes. Three vaccines such as BCRDV, IBD and RDV vaccine were applied in the present study area (Table 13). In the study area, farmers of 12 farms (60%) followed proper vaccination schedule whereas 8 farmers (40%) were not concern.

Table 8. Vaccine applied in the study area

Day	**Disease**	**Vaccine**	**Dose and route**
3-4	ND	BCRDV	1 drop in 1 eye
12-14	IBD	Gumboro (D78/228E)	1 drop in 1 eye
18-20	ND	BCRDV	1 drop in 1 eye
22-24	IBD	Gumboro (D78/228E)	1 drop in 1 eye

Part 2: Production Performance of broiler farms

Production of the 20 broiler farms with their mortality rate are given below.

Table 9: Total overview of production performance of studied farms.

Farm no.	**Flock size**	**Total live weight (kg)**	**Total feed(Kg) provided**	**Feed company**	**FCR**	**Total death no.**	**Mortality rate (%)**
1	1200	1850	2600	Kazi	1.40	74	6.16
2	800	1150	1850	Provita	1.61	75	9.38
3	1000	1460	2025	Kazi	1.39	35	3.50
4	1200	1810	2850	Kazi	1.57	65	5.42
5	1400	2010	3200	Kazi	1.59	160	11.43
6	600	820	1300	CP	1.59	47	7.83
7	1300	1850	2850	CP	1.54	110	8.46
8	1200	1760	2875	Provita	1.63	78	6.50
9	1000	1460	2150	Nurish	1.47	55	5.50
10	700	1030	1650	Kazi	1.60	47	6.71
11	500	675	1100	Provita	1.63	32	6.40
12	1000	1380	2100	CP	1.52	60	6.00
13	800	1140	1825	Provita	1.60	55	6.87
14	1200	1790	2475	Kazi	1.38	54	4.50
15	700	1046	1600	Kazi	1.53	46	6.57
16	700	1060	1675	Kazi	1.58	37	5.29
17	1200	1730	2800	Provita	1.62	135	11.25
18	1500	2087	2880	CP	1.38	105	7.00
19	1000	1290	1900	CP	1.47	68	6.80
20	1000	1310	1750	Nurish	1.34	34	3.40
Total /rate	20000	28708	43455		1.51	1372	6.86

Discussion

Maximum farmers found more to rear Cobb 500 as broiler strain from CP Bangladesh Ltd. and Kazi Farms Ltd. (*Hamid et.al.,2017*) than other strain in Anowara upazila. Besides that Hubbard classic (Aftab Broiler Farm limited) were also found to be used while found additional Lohmann and Ross in Sylhet region *(Afrin,2019*) and Ross hybrid strain in 19 farms out of 20 in Sherpur sadar upazila (*Hauque,2005*). The flooring system for broiler was mainly found kacha and pakka which is similar to the *Akter et al. (2009)* reported that in Bangladesh the maximum floor is kacha and brick. It is suggested that kacha floor should be used because there were higher growth and better FCR found in kacha floor than others (*Afrin et al,2019*). The lighting period of 21-22 hours a day is also supported by standard (*Samad, 2005)* where 23 hours is suggested as birds can be panic in darkness. The maximum farmer of Anowara Upazilla used the feed from Kazi farms (40%) which is similar to *Sultana et al. (2012)* in Santhia upazila under Pabna district but different from *Afrin et.al, 2019* as The maximum farmer of Sylhet region used the feed from CP Company. Besides, the feed from CP (30%), Pro-vita (20%) and Nourish (10%) were also found to be used. In this study, the FCR of different feed from several feed company is estimated 1.54 of CP, 1.54 of Kazi, 1.61 of provita feed and 1.4 of Nurish. So, this study suggest that, Nurish feed is better than other feeds companys' feeds. Here, the average FCR is found higher than the data indicated by the Cobb Breeding Company Limited which is also agreed on *Sarkar et al. (2008)*. The average morality rate (6.87%) is slightly higher than 6.2% mortality rate in the farms of Hariana (*Babiker et al.2009)*. In litter management, there is found maximum farmers was using saw dust (80%) as litter materials with only 20% using rice husk while *Afrin et al (2019)* reported 60% rice husk, 28% saw dust and 12% straw used in Sylhet region. In the study area, Ranikhet, Gumboro and Colibacillosis are common which is similar to *Afrin et al (2019)* reported in Sylhet region. But, *Islam et al. (2015)* reported that Coccidiosis and Infectious Bursal disease are common in Mymensingh and Barguna district. In Anowara upazila, BCRDV and Gumboro (D78/228E) vaccines were being used against ND and IBD. Only 60% farms was under proper

vaccination management while 90% of farmers using vaccines regularly is reported by *Sultana et al. (2012)* in Pabna and 72% by *Afrin et al (2019*) in Sylhet.

Limitations

The information used in the study are based on farmers and relative workers interviews. There was not observe the full management techniques for single flock of total 32-35 days of broiler rearing.

Conclusion

Poultry sector is one of the major important sectors of our public health and national economy. Although the poultry industry and business is progressed considerably, but still the industry is facing a lot of problems that creates hindrance in poultry farming and business. The major problems of broiler farming are high price of feed, disease, high mortality rate, in-appropriate management system, unorganized and unstable marketing system high and fluctuating price of feed ingredients for the industry, lack of quality control of feeds, export of feeds etc. Hope, the results of this study area will be useful for farmers and researchers to identify the overall problems and their remedies on feeding, management and marketing related to broiler farming. The findings may therefore reveal some valuable information thereby ensure proper management of broiler in rural as well as urban area of Bangladesh.

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Biography

I am Abdullah Al Masud, son of Mr. Abdul Momen and Mrs. Rehana Begum. I passed Secondary School Certificate in 2012 (GPA-5.00) followed by Higher Secondary Certificate in 2014 (GPA-5.00). Now I am an intern veterinarian under Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University (CVSU). In future, I would like to work as a veterinary practitioner and research on animal diseases and production improvement in Bangladesh.

Gallery

Figure 1&2: broiler farm shed in study area. (1 is two-storied house and 2 is single storied shed)

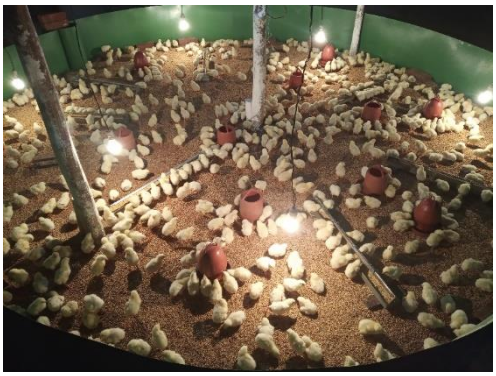

Figure 3: Brooding of DOC within the chick guard (4th day)

Figure 4: Feeder and drinker placement in broiler farm.

Figure 5: Lighting of the broiler house in the study area.

Figure 6: An inside view of birds condition at night.

Appendix

Questionnaire for data collection

Broiler Farm Management and Practices in Anowara

Farm no.		Date:	…../……./…….
Farmer information:			
Name:		Mobile no.:	
Age:	Sex: *male/female*	Family members no.	
Address:			
Farm information			
Farm location:			
Shed no.		Flock size	
Raering system:*intensive/ semintesive*		Present condtion:	
From which company DOC was bought?:			
Who works in the farm? (no.):			
Husbandry practices			
Shed space (sq.ft)		Roof materials:	
Wall types:		Floor type:	
Feeder (unit for ….birds)		Waterer (unit for ….birds)	
Linear feeder		Small drinker	
Round feeer		Large drinker	
Brooding management:			
Brooding methods		Lights:	
Brooding days:		Chick guard size	
Temperature management:			
Feeding management			
Types of Feed use:	□ Starter	□ Grower	□ Finisher
Time of use :			
Feed company?:			
Feeding times per day :		Water changes per day:	

Feed storage:		Water source:			
Total feed consumption in complete flock (in kg):					
Lighting management					
Lighting hour (s):		Daylight (hour)			
Bulb no		Artificial light (h)			
Watt per bulb		Bulb type:			
Lighting condition: Good/ Enough / Bad					
Biosecurity management					
Footbath :	□Yes □No	Chemical use:			
Wall coverings	□Yes □No	Materials:			
Floor disinfection:					
Shed disinfection:					
Litter management:					
Little materials					
Depth of litter (inch)		Beginning		End	
Shake up time:					
Uses of litter after farm use:					
Vaccination and disease control					
Follow vaccination schedule: □Yes □No					
Vaccine name:					
Common disease (s)					
Farm consultant	□Vet □Quack	Frequency of visit			
Production performance:					
Total live weight of last flock (in kg)			Rearing length (days):		
Farmers satisfaction: □ Profit □ Loss			Total death:		
Other:					
Problems in farm: (according to farmers)					

Signature of farmer with date